

SOME UNUSUAL BRACONIDAE (HYMENOPTERA)<sup>1</sup>

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*Abstract.*—Figures are presented to show features which may be useful in determining relationships of *Gnathobracon babirusa* A. Costa, *Pseudodicrogenium monstrosum* Fahringer and *Bequartia gigantea* Fahringer. Two new species, **fuliginosa** and **promisca**, are described in *Bequartia*. A new rogadine genus, **Dimorphomastax**, is described with **peculiaris** as a new species. A system for naming areas of the mandible is proposed.

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One of the most difficult problems in the taxonomy of Braconidae remains that of the suprageneric classification. Individuals beginning to work with the family soon realize that the segregations between subfamilies or between tribes are far from being clear and that characters overlap or do not hold. Part of the problem lies in the fact that classifications originally proposed for material from particular areas simply do not fit when the fauna of other regions is explored. Part is due to our lack of knowledge of the features of species incompletely described long ago, and some of it is due to our failure to visualize correctly specimens upon reading descriptions. Figures are often lacking and occasionally are so inaccurate as to be misleading. The combined result of these factors is a great need to restudy type-specimens and to publish the data regarding them before attempting to either confirm or restructure the higher categories within the family. The notes and diagrams which follow are presented in order to help provide bases for clarification of certain questions. The diagrams were made by use of an ocular grid and squared paper.

*Gnathobracon babirusa* A. Costa

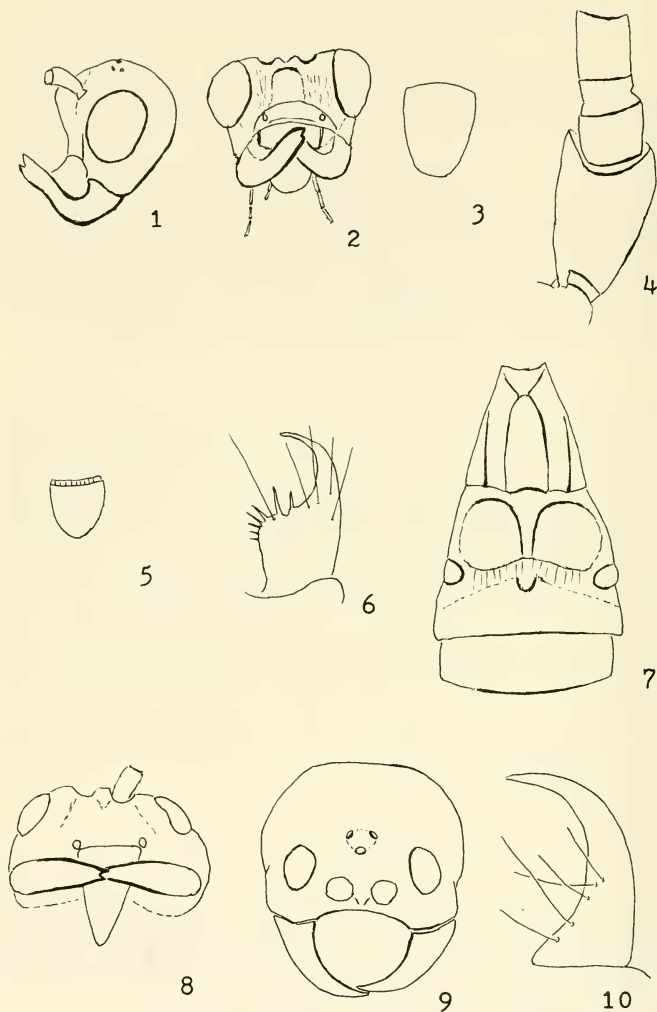
Figs. 1-7

One of the subfamilies, the Gnathobraconinae, established by Szépligeti in 1904 and based upon *Gnathobracon babirusa* described by A. Costa in 1864 from the northern part of South America, has long been an enigma.

Through the kindness of Prof. G. Viggiani, it became my privilege to

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Figs. 1-7. *Gnathobracon babirusa*. 1, Head, antero-lateral. 2, Head, frontal. 3, Labrum. 4, Base of antenna. 5, Outline of scutellum and prescutellar furrow. 6, Outer claw posterior leg. 7, abdominal terga 1-4. Figs. 8-10. *Pseudodicrogenium monstrosum*. 8, Head, front view. 9, Head, dorsal view. 10, Outer claw middle leg.

study and photograph the unique type which is in the collection of the Institute and Museum of Zoology, University of Naples. Though I had been unable to visualize the specimen from the descriptions, actually both those by Costa and Szépligeti were good and stressed salient features. The problem lay in the fact that the insect is so different from what people who look at braconids are accustomed to seeing.

The type female carries Costa's label. Labels bearing the Museum No. 8768 and indicating that it is the specimen studied and published upon by Szépligeti are alongside. The specimen is about 13 mm long, with the ovipositor adding about 10 mm more. Forewing length is 13 mm.

Description.—Head black, polished above; thorax dark reddish brown and polished above, black below. Wings banded, pale at base, a dark band just before stigma, yellowish behind stigma, apex dark. Stigma yellow. Fore coxae reddish, middle and posterior coxae piceous. Anterior and middle legs testaceous with posterior femora infuscated on distal half and posterior tibiae infuscated on apical  $\frac{1}{8}$ . Abdomen testaceous through tergum 4, black beyond.

Head immargined, no scrobes *per se*, but front depressed ahead of anterior ocellus and a groove runs from it to between antennae. Both antennae broken but at least 57 segments remain in the right antenna, segments beyond 4th flagellar at least as wide as long. Scape and pedicel as shown in Fig. 4. Face flattened, impressed below a transverse ridge located below antennae. Not cyclostome, clypeus insunken between anterior tentorial pits, slightly raised at apex to form a low rim which becomes higher and roll-like at side. Labrum from in front appears as a great flat plate which hangs down between and behind mandibles. Enormous mandibles start out normally but then curve upward, forward and mediad, the apices crossing (see Figs. 1–2). A large open space left in front of the labrum and clypeus. Mandible, in cross section, flat on inside, rounded on outer side but becoming quite flat after bending, the upper tooth longer than the lower. Maxillary palpus 6-segmented, labial 4. Relative measurements: Malar space 10, eye height 45, eye length (anteroposteriorly) 35, temple length 20.

Wing venation typical of Braconinae, i.e., submediellan cell short, nervulus interstitial. Relative lengths: 1st abscissa radius 4, 2nd 15, 3rd 30; 1st intercubitus 9, 2nd 7.5; upper abscissa of basal 5, lower 10. Radiellan cell does not broaden apically; 1st abscissa of mediella 10, second 30, basella 8.

No prepectal carina or sternaulus. Notaulices very faintly impressed, indicated mostly by lighter color. Scutellum low, not margined, shaped as in Fig. 5. Propodeum smooth, with long, fine, whitish hairs which also occur on metapleuron and hind coxa. No chaetobothria. Outer claw of posterior leg as in Fig. 6. Major abdominal features as sketched.

*Pseudodicrogenium monstrosum* Fahringer

Figs. 8-10

In 1936 Fahringer erected the subfamily Pseudodicrogeniinae for his monobasic genus *Pseudodicrogenium*. Van Achterberg (1976) in his key (couplet 3, p. 40) points out that "exceptionally the face takes part in the hypoclypeal depression (Tribe Pseudodicrogeniini), resulting in a concave face and flat clypeus," and on p. 77 he presents drawings. On p. 35 he places the tribe in the Braconinae.

There are two specimens of *monstrosum*, the lectotype and paralectotype respectively, in the Musée Royal de l'Afrique Centrale at Tervuren. Based upon these specimens, whether the genus should be placed in the Braconinae or not might be questioned. The species is not cyclostome in the usual sense. The face is impressed, and the clypeus is bent inward and not raised at all. The labrum, continued in almost the same line as the clypeus, forms an elongated triangle which extends back between and behind the mandibles; and it is not concave anteriorly. The massive mandibles project forward and appear to arise on a projection which is the extended gena; and a space is left between the mandibles and the labrum. The front tibia carries very numerous characteristic robust reddish "hairs" or chaetobothria, most of which are about as long as the diameter of the tibia. These structures occur on the inner front aspect and, toward the apex of the tibia, tend to form into transverse rows; they are broad and appear much like the apical transverse row.

It would appear that the genus is sufficiently different from the cyclostome forms that it might be held separately as Fahringer handled it.

*Bequartia gigantea* Fahringer

Figs. 11-15

Fahringer described the genus *Bequartia* (sic) in 1936 based upon a single male from Elizabethville. The specimen, which he named *gigantea*, had been collected by Dr. M. Bequaert. While Fahringer spelled the name incorrectly both in the generic name and in giving the collection data, it is obvious that an error occurred as it is written *Bequaertia* on the determination label. However Schouteden had used *Bequaertia* in 1913 for an hemipterous genus and Pic in 1914 used *Bequaertiella* for a coleopterous genus. Other comparable names have been used (see Neave, 1939), and therefore it appears best to accept the generic name as it appeared originally.

Through the kindness of Dr. J. Decelle, I was able to examine and photograph the unique type which is housed in the Musée Royal de l'Afrique Centrale. While the genus belongs to the Rogadinae as Fahringer indicated, certain corrections should be made in the original description. The maxillary palpi are 6-segmented; and the terminal segments are normal, not as Fahringer drew them. The prescutellar furrow is crenulate and is crossed by

carinae. The radius emerges at about the basal one-third of the stigma, and the stigma is relatively narrow. The area just behind the stigma is deeply pigmented; and, at first glance, the stigma appears much wider than it actually is. Because of the color pattern, one must sometimes look closely to see where the radius actually emerges. The first abscissa of the radius is decidedly thickened at the base but rapidly becomes more slender as illustrated in Fig. 13. The sculpture of the abdomen is much finer than Fahringer's diagram would indicate and is rather typical. The claws are finely pectinate, and the posterior tibial spurs straight.

Six additional specimens (including two females) of *gigantea* in the British Museum of Natural History in London, an additional female from the collection in Tervuren, and four specimens representing two additional species enable further characterization of the genus. In addition to the usual roga-dine features, the thickened base of the radius and the strongly incrassate hind tarsi are distinctive. (In the female the posterior tarsus, while thickened, is less so than in the male.) The prepectal carina is present. On the base of the propodeum occurs a most unusual structure which is more highly developed in males than in females, although its degree of development in the males varies some. In the female this structure is like a pair of horizontal, flat, rimmed areas, with the posterior rim being highest near their juncture in the middle. The flat area is covered by very dense pile-like hair. In the males the pile-covered area is much larger, the maximum development being as indicated in Fig. 11. It is tumescent, raised centrally; and at its apex the pile-covered surface appears to slide under the regular propodeal covering. The propodeum is decidedly raised (bulged) on each side behind the pile-bearing area.

Two females and four males collected by S. A. Neave at Mlanje, Nyasaland in Oct. 1912, Jan. 1913 or Dec. 1913 are in the British Museum of Natural History and one female taken by F. G. Overlast at Lulua: Riv. Luisa X-1933 is in Tervuren.

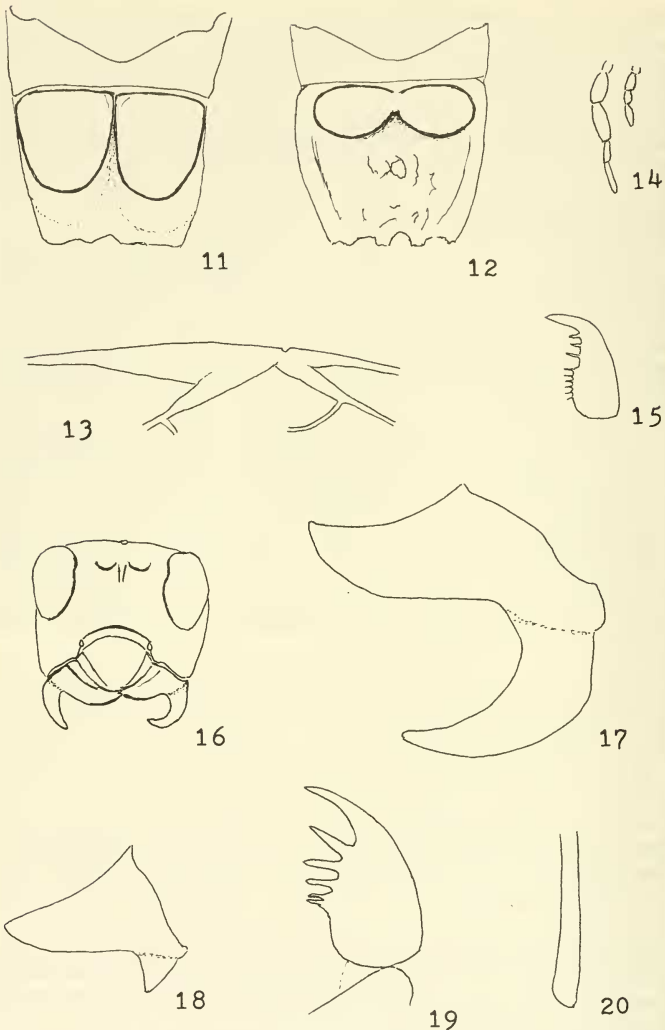
#### *Bequartia fuliginosa* Shenefelt, NEW SPECIES

Differs from *gigantea* primarily in having the wings infuscated, excepting only the very base of the stigma and the parastigma which are testaceous.

Holotype.—♂, "Coll. Mus Congo. Ruanda: Rukoma (cheff.) Terr. Nyanza I-1953, P. Basilewsky" in the Musée Royal de l'Afrique Centrale at Tervuren.

Description.—Length 16 mm. Forewing length 14 mm. Wings dark brown excepting lighter base of stigma, parastigma and adjacent part of basal. Eyes, antennae, anterior pretarsi, middle tarsi, posterior tibiae and tarsi black. Otherwise ferruginous.

Paratypes.—TERVUREN: "Musée du Congo. Katanga: Kansenia XI-1930, G. F. de Witte" 1 ♂. BRITISH MUSEUM (NATURAL HISTORY):



Figs. 11-15. *Bequartia gigantea*. 11, Propodeum of male showing pile covered area at base. 12, Same in female. 13, Stigma, bases of radius and basal. 14, Palpi of male (first

"Salisbury Mashonaland. Nov. 1899, G. A. K. Marshall. '124'. Marshall Coll. 1909-323," 1 ♂.

*Bequartia promisca* Shenefelt, NEW SPECIES

Differs from *gigantea* and *fuliginosa* in its smaller size, in the wings being infuscated excepting the testaceous parastigma, a pale spot surrounding the juncture of the recurrent and the cubitus and a pale transverse band extending across the posterior half of the radial cell, the base of the third cubital cell and into the second discoidal.

Holotype.—♀, "Uganda, Sukh Plains, Nr. Nepal Pass 1931. Dr. E. B. Worthington. Cambridge Univ. Exp. B. M. 1931-545" in the British Museum (Natural History).

Description.—Length 13 mm. Forewing length 12 mm. Wings brown except as indicated above. Head and thorax testaceous, abdomen ferruginous. Eyes and antennae black. Anterior pretarsi, middle tarsi, posterior tibiae and tarsi dark brown. Antennae distinctly longer than body, with 90 segments in flagellum.

*Dimorphomastax* Shenefelt, NEW GENUS

To describe the structure involved here, it is necessary to review the structure of the mandible and to propose certain new terms. Each mandible is articulated anteriorly and posteriorly and is attached to the ventral margin of the cranial wall by membrane between the articulations. At the anterior articulation, a process from the subgena fits into a cavity of the mandible called the acetabulum, which is located on the inner basal angle of the mandible. (Imms calls this the ginglymus of the mandible.) At the posterior articulation, the mandible carries a projection known as the condyle (=post-tartis). This bulbous structure fits into a socket of the subgenal wall near the distal end of the hypostomal carina. Each mandible may be regarded as essentially a hollow tetrahedral structure. If the base of the bottom triangle is thought of as being formed by the portion between the acetabulum and the condyle and this is regarded as the outside, the adductor muscle is attached at approximately the apex. Actually, the outer surface of the mandible, extending distally from what we have been calling the base of the bottom triangle, may be bowed outward or bent in other shapes. Likewise the upper inner face, extending distad from the side of the basal triangle

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segment not shown on maxillary palpus). 15, Outer claw of hind leg, from type. Figs. 16-20. *Dimorphomastax peculiaris*. 16, Head of type from front. 17, Outline of left mandible of type male. 18, Outline left mandible of allotype female. 19, Outer hind claw of type. 20, Inner spur of posterior tibia of male.



from the acetabulum to the apex, may be invaginated (bent toward the middle of the mandible in cross section) so the mandible becomes concave on the inner aspect. The third side of the bottom triangle, from the condyle to the apex, serves as the base of the underside of the mandible or the lower inner surface. The angles between the three sides vary considerably from species to species both in sharpness and in degree, and the mandible is often twisted in such a way that the teeth of the mandibles meet each other in a vertical instead of a horizontal plane, or the mandible may be modified in other ways. With downward extension of the postgena, the acetabular-condylar line may become practically vertical so the anterior articulation of the mandible appears dorsal.

Obviously a structure such as that described and used for biting or crushing needs strengthening. And the mandible is very often braced by a sharp edge or carina which can be called the *condylar carina* as it runs from the condyle along the lower edge of the outer face of the pyramid to the lower tooth or a little above it. A similar carina may be developed along the upper (anterior) edge of the mandible and proceeds from the acetabulum to or nearly to the upper tooth. This may appropriately be called the *acetabular carina*. The carinae tend to be most robust near their origins. On either or both sides of the carinae grooves may appear, especially along the condylar. When this occurs, a bracing ledge is formed which may be quite plate-like and which serves as a buttress. Between the two carinae the outer face of the mandible may be sculptured in various ways. In contrast, the upper inner face is normally smooth. The lower surface or third face of the pyramid, i.e., that portion extending from the condylar carina to the smooth, usually concave portion, is often flat and is usually much narrowed near the teeth and suddenly broadened toward the base where the adductor muscle is attached. Frequently a thickening of the mandibular wall occurs around the basal margin. This reinforcement is normally set off by a shallow groove around the margin and is most evident along the base of the lower side. While the lower side may carry sensoria and hairs, it has been utilized very little in classification.

In *Dimorphomastax* the condylar carina has undergone strange development. In the male the base of the carina has been produced outwards to such an extent that it appears like a sickle, and the two projections together appear like a second set of mandibles. In the female the outgrowth is limited to a lamellar, triangular tooth. This modification of the base of the condylar carina will at once separate the genus from all other rogadoine genera. The prepectus is margined; the recurrent enters the first cubital cell; the antennae are multiarticulate; the propodeum is not armed; there are three cubital cells; the first abscissa of the mediella is longer than the second; the spiracles of the first abdominal tergite are normal; the tarsi are normal; the first ab-



dominal tergum is broadened posteriorly; the suturiform articulation is distinct; the claws are coarsely pectinate; the sternaulus is absent.

Type for the Genus.—*Dimorphomastax peculiaris*, new species.

*Dimorphomastax peculiaris* Shenefelt, NEW SPECIES

Figs. 16–20

Holotype.—♂, "6 mi. S. Durango, Dgo. MEX. 6100' July 14, 1964, W. R. M. Mason." In the Canadian National Collection at Ottawa.

Description.—Length 4.8 mm. Forewing length 5.0 mm. Head, excepting testaceous to brown mouthparts, black. Antennae brown. Mesonotum black, metanotum and apex of scutellum margined with testaceous, remainder of thorax brownish to piceous. Legs, including coxae, testaceous; pretarsi darkened. Abdomen testaceous. Face finely granular. Both antennae broken but 41 segments remain in flagellum of left antenna. All flagellar segments longer than wide. Notaulices distinct. Mesonotal sculpture of ovoid pits separated by about their diameter and surrounded by shining plaquettes which mostly appear as 2 rows on the intervals between the pits. Propodeal spiracle oval. Propodeum finely granular-rugose, with a median carina on basal  $\frac{1}{4}$ . Scutellum covered by fine shining plaquettes which are smaller than those between the pits on the mesonotum. Sternaulus absent. Mesopleuron punctulate on lower  $\frac{1}{3}$ , roughened below anterior wing base, mesopleural fovea and speculum distinct. Wings lightly infuscated. Radius emerging beyond middle of stigma, inner margin to outer margin as 4:3. First abscissa of discoideus shorter than 2nd (as 13:16). Radiellian cell widening distally, postnervellus present, 1st abscissa of mediella longer than 2nd (as 32:25). Abdominal terga 1, 2 and basal  $\frac{1}{2}$  of 3 longitudinally strigose with shining spots along the irregular carinae and with a median carina. Boss at base of 2 short, about  $\frac{1}{12}$  as long as the tergum, and extending across middle  $\frac{1}{3}$ . Terga 4–7 depressed anteriorly and with dense bands of long golden hairs across the middle. Tergum 5 with a fringe of apical hairs. Posterior tibial spurs blunt.

Allotype.—♀, "MEX. Dgo. 7 mi. W. Durango, 7000' 29 July 1964, W. R. M. Mason." In the Canadian National Collection at Ottawa.

Differs from the ♂ in having the condylar carina produced only into a triangular tooth at base, in having the posterior tibial spurs pointed and in having terga 4–7 alutaceous, sparsely hairy, not impressed. Tergum 5 lacks the fringe of apical hairs. The flagellum has 46 segments; the apical one conical at the tip. The ovipositor sheath is dark and is approximately as long as the second segment of the middle tarsus.

Paratypes.—CANADIAN NATIONAL COLLECTION in Ottawa: 7 mi. W. Durango MEX. 29.VII.64 L. A. Kelton, 1 ♂; Santa Lucia, Sin. MEX. 4-VIII-1964 4000', J. F. McAlpine, 1 ♂ and 1 ♀; MEX. Sin. 15 mi. W. El

Palmito, 5000' 11 July 1964, W. R. M. Mason, 1 ♂. MUSEUM d'HISTOIRE NATURELLE in Genève: Mexiq. Orizaba, 1 ♂. RIJKSMUSEUM van NATUURLIJKE HISTORIE in Leiden: Meseum Leiden. MEXICO, Veracruz, Fortin, 900 m 1.XII.1962, C. & O. Epping, 1 ♂. ENTOMOLOGY MUSEUM, UNIVERSITY OF MICHIGAN at East Lansing: Rio Blanca, V. C., Mex. 11-13-57, R. & K. Dreisbach, 1 ♂. AMERICAN ENTOMOLOGICAL INSTITUTE at Ann Arbor, Michigan: Portal, Ariz. VIII-26-1974, H. & M. Townes, 1 ♂; Portal, Ariz. VIII-24-1974, IX-2-1974, IX-5-1974 and IX-9-1974, H. & M. Townes, 4 ♀♀.

Discussion.—In the paratype males the outgrowth from the condylar carina varies in width from nearly as wide as the base of the mandible to only about  $\frac{1}{4}$  the width and in length from about  $\frac{3}{4}$  to longer than the mandible. The 'tooth' on the female also varies in size. The thorax is mostly testaceous in two of the males. In size the males vary from a little less than 5 mm to over 7 mm.

#### ACKNOWLEDGMENT

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